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Just transition management: Balancing just outcomes with just processes in Australian renewable energy transitions

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HIGHLIGHTS

- A fusion of the transition management and just transition concepts is proposed.
- This is applied to a nested case study of an energy transition in Australia.
- The framework reveals a just transition is possible but not guaranteed in this case.
- The framework is shown to be useful in highlighting barriers to energy justice.
- Just transition management could support energy justice in transitions globally.

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ABSTRACT

Transitioning electricity generation sectors to renewable energy is a necessary element of climate change mitigation but a challenging one with years of technical and social lock-in creating considerable inertia and a pace of change insufficient to meet the task. Transition management has emerged as a promising approach to proactively manage and accelerate transitions in sectors like energy and water and has the potential to do so in manner that would help secure energy justice. However, the approach has been criticised for ignoring the political dynamics of transitions, risking procedural and recognition injustice for traditional energy production regions while increasing opposition to a transition. This paper uses a qualitative case study approach to understand how a transition to renewable energy generation could be achieved in a way that secures energy justice for traditional energy production regions like those of Gladstone in the Australian state of Queensland. The paper augments the transition management approach with the "just transitions" concept, which has emerged from labour movements as a means to mitigate negative impacts on workers and communities in traditional energy production regions, to create a "Just Transition Management" framework that is applied as a diagnostic tool to the case study. While results suggest a transition is imminent within Queensland, a lack of: consistent, supportive federal policy; long-term visions, and a clear process leaves it at risk of being captured by the powerful incumbent resources sector utilising an "environment vs. jobs" narrative. Yet, the results also suggest that adopting a just transition management approach has the potential to successfully resist the influence of the resources sector, by providing cheap, secure renewable energy and supporting affected workers into roles in the renewable energy sector using a reflexive, representative network governance approach. Data analysis reveals how the application of just transition principles has already engaged communities and unions that were previously sceptical of renewable energy. Overall, this study suggests that the just transition management framework assists in identifying the political barriers to transitions and energy justice more broadly, while also providing a management approach which creates powerful niche actor-networks to counter the narratives and influence of the incumbent resource sector. Thus it could support successful transitions that achieve the distributional, recognition and procedural justice needed for energy justice globally.

1. Introduction

The transition of electricity generation sectors towards renewable energy is broadly understood to be an urgent and necessary element of climate change mitigation [1]. This is particularly true of developed countries, such as Australia, which historically have been the largest

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producers of carbon emissions. These countries also have greater fiscal resources available to underpin a transition than developing countries, where energy poverty is still widespread [2]. However, such transitions have proven challenging, with years of technical and social lock-in creating considerable inertia [3–4], and Australia is no exception despite its huge renewable energy potential [5].

Transition management has emerged as a proactive approach to managing and accelerating transitions in socio-technical sectors like energy and water [6]. As such, it has considerable potential to support the transitions that are necessary to achieve climate justice. Moreover the approach contains explicit commitments to ensure affordability and reliability of supply [7] which is consistent with distributional justice, as well as to having a deliberative, democratic and representative process that is consistent with recognition and procedural justice. Distributional, recognition and procedural justice are considered essential elements of energy justice (e.g. see [8]) and so it seems the approach has the potential to help secure energy justice in energy transitions.

However, the approach has been criticised for ignoring the political dynamics of and need for democracy in transitions, risking recognition and procedural injustice for traditional energy production regions and potentially failing to ensure equitable energy access [9–11], risking distributional injustice as a result. These concerns resonate strongly with critiques of anecdotal energy transitions, which lacked representation in energy decision-making [12], thereby failing to achieve recognition and procedural justice. The authors argue that energy justice should be a central concern for advocates of transition management approaches, with a failure to achieve energy justice potentially stalling transitions, eroding public support or risking capture by incumbent actors [13], jeopardising the chance of a full transition.

Engagement with the concepts of energy justice may not be sufficient for it has been acknowledged that greater exploration of the political economy of energy justice is required [8,14]. To address the need for a stronger recognition of politics in transition management approaches and the energy justice literature, this paper proposes augmenting the transition management framework with the concept of 'just transitions'. This concept has entered the discourse of labour movements and Environmental Non-Government Organisations (ENGOs) globally, asserting transitions to more sustainable modes of production can balance climate justice outcomes with procedural justice (see [15]) in addition to, as the authors argue, distributional justice. This is achieved through an inclusive participatory process and mitigating the impacts on those in vulnerable sectors through re-training to enter "green" jobs, for example, while ensuring equity of energy access [2]. This paper posits that just transitions scholarship can contribute to achieving successful transition management that embodies the principles of energy justice by encouraging explicit political considerations, providing democratic legitimacy and turning potential barriers in the form of affected workers, unions and communities, into advocates.

This paper, in part, responds to assertion made by Healy and Barry [14] that the just transitions concept has a potential to build the political sensitivity of the energy justice field and increase the understanding of the distributional impacts of energy transitions. The concept is also regarded as having the potential to overcome prevalent "environment vs. jobs" narratives to bridge the gap between environmental justice groups seeking energy transitions and labour movements in Australian traditional energy production regions such as the Hunter Valley [16].

The central research question posed by this paper is "How can a just sustainability transition to renewable energy generation in the traditional energy production regions like those in Queensland, Australia, be managed?" In answering this question the authors aimed to achieve the following research objectives:

1. Use the concepts of transitions management to establish Queensland's likely transition trajectories.
2. Establish the barriers to a just and sustainable transition for traditional energy production regions like Gladstone.
3. To explore the potential of a novel conceptual "Just Transition Management" framework to identify approaches to overcome such barriers to secure energy justice in energy transitions.

Australia boasts considerable renewable energy potential, yet has an influential incumbent energy regime and multiple communities that depend on mining and traditional energy production for employment [16–17]. This makes it a great context to test the proposed conceptual framework's ability to recognise and overcome the barriers (political and otherwise) to a just transition. The State of Queensland was selected as a case study following express political commitments to move towards 50% renewable energy generation by 2030 [18]. Drawing on extensive secondary data, this qualitative case study examines how a transition to renewable energy generation could be achieved in Queensland in a way that is socially just for traditional energy production regions. To this end, the paper first outlines the 'just transition management framework' which fuses the transition management and just transition concepts. Next, following an articulation of the research design and case study methods, the conceptual framework is applied as a diagnostic tool to establish whether such a transition is possible and how this may be achieved.

2. Managing sustainability transitions

There has been an explosion in sustainability transitions literature over the last two decades in response to perceived lock-in in socio-technical sectors (e.g. energy and water) impeding a necessary transition to more sustainable modes of production and consumption [6]. Though a number of different frameworks have emerged the interaction between three conceptual levels (macro, meso and micro) is central to the scholarship. The meso level is characterised by the current dominant socio-technical regime that favours optimisation of the current system over transformation and full transition [7,13,19]. At the micro-level are emergent niches that innovate more sustainable modes of production, to which the regime is resistant. However, the transition to more sustainable modes of production generated at the niche level is facilitated when the niche aligns with landscape factors at the macro level, which are outside the regimes control, thereby destabilising the regime and driving a transition [7,13,19].

The transition literature has proposed a number of different frameworks to understand, guide and accelerate sustainability transitions, one of which is transition management [6]. This article focuses on the transition management framework specifically, for it promotes the active management of transitions and has a high potential for democratic, deliberative and representative management of transition [20]. The authors suggest that the democratic potential means it well positioned to accelerate transitions while securing the recognition, procedural and distributional justice acknowledged to achieve energy justice [8]. To address critiques of transition management being more technocratic than democratic (see Section 2.1), the authors propose this approach should be augmented with "just transitions" concepts to realise its full potential for achieving energy justice. This section outlines the two concepts before fusing them into a framework aimed at delivering successful energy transitions that also secures energy justice.

2.1. Transition management

The transition management framework uses a purposive approach to transitions, seeking to nurture niches for greater sustainability and guide them through a series of stages: pre-development, take-off, acceleration and stabilisation [19], see Table 1). A smooth transition is not assured with a number of different end results possible aside from the desired stabilisation of the more sustainable modes of production.

Core to the approach is a participatory, reflexive and adaptable network governance approach (whereby a series of transition

Table 1
Phases of sustainability transitions.
Adapted from Rotmans et al. [7], Van der Brugge and Rotmans [99] and Voß et al. [19].

Phase	Description of positive scenario	Negative scenario
Pre-development	The dominant regime is relatively stable but where innovative niches exploring technologies and practice may be emerging.	System breakdown: Sustainable niches fail to emerge and stabilise leading to the continuation of the existing, unsustainable socio-technical regime until it fails altogether.
Take-off	Emergent niche starts to become more viable and exert pressure on the regime.	Lock-in: Innovation investment is limited to improvement options that operate within the existing regime, choking resources for more innovative forms.
Acceleration	Process of dynamic learning relating to novel practice and technologies spanning multiple domains start to cause a structural change and their rapid uptake.	Backlash: A failure to embed the emerging niche effectively or achieve the needs of consumers leads to a backlash against it that allows the regime to regain control.
Stabilisation	Structural and social change decelerates as the emergent technologies and practices reach equilibrium.	N/A: Innovative niches become the adopted model for the socio-technical system and stabilise into a new regime.

experiments and eventual scaling are governed by a representative network of actors from multiple levels and sectors [21], to ensure that emergent practices and technologies are not curtailed in favour of the existing regime or a lock-into a process of optimization [7,21–22]. In spite of the democratic potential of such an approach a number of scholars assert transitions management is excessively apolitical [9–10,13,23–25]. These critics further contend that transition management processes "consistently focus on elite actors, particularly technical experts and entrepreneurs, in the decision-making process." [26] with other actors, such as those in broader civil-society, sometimes disempowered rather than empowered [27]. This risks decreasing the democratic legitimacy of the process [28] risking a public backlash, as well as a failure to recognise political asymmetries, leading to the capture of transition processes by regime actors [13].

These criticisms appear to relate to the application of transition management, and not its conceptual framings. The network governance design is geared to create a democratic and inclusive process in theory [26]. By giving a platform to marginal, niche views of socio-technical sectors, transition management subverts the unbalanced political influence regimes over democratic institutions (a particular issue in the Australian energy sector, see Section 3.1) by creating a counterpoint reflexive network governance niche [11]. As such the authors argue that it has a strong potential to achieve energy justice by including groups that have been marginalised from energy decision-making processes. This paper builds on this potential by exploring how the transitions management framework can be augmented by the just transition concept to mitigate the negative impacts of transitions and empower groups that would otherwise be marginalised from energy decision-making through a participatory approach. Doing so should achieve distributional, recognition and procedural justice recognised as critical elements of energy justice [8].

To create a diagnostic tool it was necessary to distil the elements considered necessary for a successful transition management process from the broader literature. The criteria through the analysis of historic and current transitions is summarised in Table 2.

2.2. Just transitions

The just transitions concept first emerged in Canada during the 1990s when unions tried to reconcile environmental imperatives with justice for workers [29], and has become central to the global union movement over the last 15 years [15]. The concept is an attempt to overcome a union perception of "Environment vs. Jobs" [29]. The concept has worked its way through to the International Labour Organisation (ILO) and the United Nations Environmental Programme (UNEP) where the principles are reflected in policy documents, which assert that affected regions "*will need pro-active assistance in creating alternative jobs and livelihoods…and weathering the transition to new industries*" [30]. The concept has also filtered down to multiple national unions through global union networks, including Australia [31], and has become core to labour environmentalism globally. Environmental

Table 2
Summary of criteria for a successful accelerated transition management process,

Category	Criteria
Indicators of an imminent transition	Landscape pressures on regime[a] Emergent niches aligning with landscape[a] Strong public support[a]
Requisites for managing the transition successfully	An engaged government providing a supportive and stable policy framework[a,b] Clear, shared long-term vision with supporting goals, interim objectives and monitoring[a,c,d] Front-runner network representing regime and niche actors from multiple sectors with sufficient resources and supported by robust coalitions, operating a through a reflexive governance process[a,e]

[a] Rotmans et al. [7].
[b] Verhees et al. [100].
[c] Farla et al. [78].
[d] Bakker et al. [101].
[e] Brown et al. [67].

non-government organisations (ENGOs) have also increasingly engaged with the concept, recognising the potential to engage groups within affected sectors who have historically been an obstacle to the implementation of climate change policy [32].

The definition of a just transition is contested, with positions ranging from passive to transformative (see Table 3). The active positions have a shared focus on fiscal support, job creation and re-training for workers and communities affected by transitions processes, calling for an alternative development model that " questions(s) the legitimacy of the neo-liberal paradigm in a number of ways" [33]. It calls for a return to active state-led industrial planning; asserting that workers, communities and unions should be involved in the planning process to ensure quality green jobs are created and training implemented. This article engages with the minimalist position (see Table 3), as the passive position is consistent with an optimisation/lock-in pathway as opposed to a full transition. Secondly, the minimalist position is a better fit with transition management than the transformative approach for, though transitions management advocates for pro-active industrial planning, it does not necessarily seek to fundamentally alter socio-economic structures, with Rotmans and colleagues pointing to a role for governments in shaping markets while recognising the importance of liberalisation (2001, p.25).

Against this background, criteria for what may be considered a just transition can be established, including: (i) the financial support and (ii) transition of workers into green jobs, and (iii) the involvement of unions and communities in a process of proactive industrial planning. Green jobs are defined in line with the UNEP definition of "work in agricultural, manufacturing, research and development (R&D), administrative, and service activities that contribute(s) substantially to preserving or restoring environmental quality" [34] though the focus of

Table 3
Range of potential Union responses to transitions.
Adapted from [31].

Response type	Features
Passive	Business as usual, prioritising the expansion of production and protection of workers' jobs and only accepting transitions when jobs are preserved in the current industries
Minimalist	Promotes green capitalism with the creation of decent "green" jobs for re-training and financial support for affected workers, with unions representing workers in decision-making
Transformative	A fundamental shift of the socio-economic system to subordinate production to the needs of humans and the ecosystems as opposed to profit with the democratisation of production ownership and control

this research will primarily be on the opportunities created by the renewable energy sector.

In addition we will extend the definition of "just transitions" to include issues around climate and energy justice as suggested by Newell and Mulvaney [2]. This would require the achievement of distributional justice, in this case ensuring secure energy access for low-income in Queensland. This is appropriate as several unions explicitly specify this criterion in their definition of a just transition (including the Australian peak union body, [35]. It also aligns with the transition management literature, which acknowledges the importance of affordability and reliability of supply as key conditions [7].

Bringing the just transition criteria alongside those related to transition management resulted in the development of the 'just transitions management framework' (Fig. 1), which will be applied to a case study of a transition process in Queensland, Australia. The logic of the framework is that the concept of just transitions contributes to that of transitions management through the explicit consideration of procedural justice, ensuring democratic legitimacy. Similarly, concepts within transition management could supply a framework through which the objectives of "just transitions" and energy justice can be delivered.

3. Research approach

This article draws upon a single, embedded case study design to demonstrate the utility of the just transition management framework not only for the active management of transitions, but also as a diagnostic tool for identifying barriers and opportunities for an accelerated transition to predominantly renewable energy. To answer the question "*How can a just sustainability transition to renewable energy generation in the traditional energy production regions like those in Queensland, Australia, be managed?"*, and the associated objective this qualitative study was conducted over two phases. In this section we will briefly outline the Australian context before explaining the two phases of research and the limitations.

3.1. The choice of the Australian context

Australia is a country with significant renewable energy potential with multiple studies indicating that it would be possible to transition to renewable energy production while maintaining affordability and reliability of supply (e.g. see [36–37]), with renewable sources now having the lowest levelised cost of electricity [38]. There is also evidence to suggest that the transition would prompt a net job growth with a relatively low cost of re-training for traditional energy workers to

Landscape Pressures on regime
Transition Management
Just Transitions
Formation of transition arena and frontrunner network
Government taking a leading role and providing a supportive policy framework
Clear, shared long term vision with supporting goals, interim objectives and monitoring
Participatory process of active industrial planning (recognition, procedural).
Transition balanced with need for affordability and reliability of on-going supply (distributional)
Evolution over long time scales as opposed to sudden revolutions
Labour unions communities and CSOs involved in transition planning (recognition, procedural)
Impacts on vulnerable communities are mitigated by appropriate fiscal support and green job creation (distributional)
Niche aligning with landscape
Popular support

Fig. 1. Criteria for managing a transition sustainably and justly: Just transition management framework. Relevance of elements to different forms of justice are expressed in brackets.

enter the solar sector for example (e.g. see [39–41]). As such it would seem that a just transition is at least theoretically possible. There are also extensive selective landscape pressures aligning with renewable energy niches and applying pressure to the current regime, suggesting that a transition may also be imminent in Australia. For example, research by Australia's Climate Change Authority (CCA) indicates that Australia's climate change commitments effectively obliges Australia to achieve net zero emissions in the stationary energy sector "well before 2050" [42]. This pressure is compounded by the fact that 70% of global energy investment in 2015 was in renewable production [43] while thermal coal use is considered to be in terminal decline (see e.g. [44–45]) and natural gas uptake is projected to be lower than anticipated [46]. Finally, there appears to be broad public support for renewable energy coupled with majority support for the phase-out of coal in the next 20 years (e.g. see [47]) though the authors note anecdotal discrepancies between levels of acceptance at the national level and those of communities hosting renewable energy [48].

In spite of this potential the transition to renewable energy at the federal level remains slow, a fact attributed to the highly partisan nature of energy policy in Australia and a misalignment between the state and federal government levels, leading to extreme policy instability [49]. This instability has been attributed to a long-standing "coal government nexus" with the coal and broader minerals industry being unusually effective at translating "marginal economic power into political influence, to maintain and extend structures of advantage in state policy" [17]. The industry has number of peak bodies that have considerable ability to influence public narratives and policy, effectively naturalising the coal industry in Australia with the support of both major parties [50].

The coal industry is supported by a network of energy intensive industries (i.e. aluminium, steel and LNG), thee growth of which has historically been supported by cheap, reliable energy provided by black coal [5]. This coalition (which is characterised as part of the regime here) has been effective in influencing government policy to divert funding from "disruptive innovation" like renewable energy towards "evasive innovation" technology such as carbon capture and storage (CCS) [5]. Evasive innovation is consistent with the lock-in or optimisation trajectory noted in Table 1. The resources industry have supported this by perpetuating negative narratives around the affordability, reliability and feasibility of renewable energy, suggesting that moving to renewable energy would prompt a "jobs carnage" in regional areas [51].

The energy policy instability coupled with an incumbent government, which has stripped back a number of supportive measures for renewable energy (see [52]), has effectively halted renewable energy investment since 2013 [53–55] at a time when renewable energy investment is growing globally. The absence of stable bipartisan federal climate and energy policy is seen as a threat to the affordability and security of energy risking a consumer "backlash" that would further stall climate action [56]. Backlash is an appropriate term given affordability and reliability are considered as essential criteria for both transitions management and just transitions. Thus, the highly political nature of energy transitions in Australia, coupled with a high renewable energy potential, makes it an interesting context to apply the just transition management framework and assess whether it can facilitate a transition. The Australian context will also test the potential of transition management approaches to increase democracy in energy decision-making, as the resources regime is recorded as exerting a disproportionate influence over the governments at all levels [17] with the risk of lock-in or backlash trajectories is evidently high.

3.2. Phases of research

After the initial literature review of the Australian energy context and the above concepts research was conducted in two phases to produce an original qualitative analysis of the proposed Queensland renewable energy transition (first phase, see Section 4 for results) and the attitudes of attitudes of a variety of political actors towards a potential transition in the Gladstone region (second phase, see Section 5). It has been asserted that sustainability literature has paid insufficient attention to the role of space and scale [57] and that there is a lack of contextualisation in the sustainability literature. Having both a state and local level case study addresses this.

Queensland was chosen as the State Government there has pledged to achieve up to 50% renewable energy generation by 2030 [58]. In addition, the Queensland electricity generation sector is complex, involving multiple public and private stakeholders and integrated with the broader National Electricity Market, indicating that active management will be required to reach the 50% target.

The likelihood and barriers to a just transition at the state level was explored by examining and analysing a variety of secondary data sources including: grey literature, Australian Energy market Operator (AEMO) data on proposed energy sources and qualitative analysis of public submissions responding to the *Queensland Renewable Energy Expert Panel's Issues Paper* [18]. This document was designed for consulting with the public and aimed at informing the Panel's recommendations regarding potential pathways to 50% renewable energy generation [18]. The initial document and panel terms of reference were used to analyse the governance of the transition process, while formal submissions made in response to it were analysed to identify potential political barriers to the transition as well as the sentiments of the different stakeholder groups. The submissions and recommendations therein were captured and coded to reflect actor type (using the regime and niche concepts), with recommendations coded to recognise emergent themes. This research was necessary as the process and target have not been the subject of academic research to date and was crucial for understanding the implications for the Gladstone case study, with energy transitions being inherently multi-scalar. The findings were triangulated against existing data sources on the Queensland energy sector (as well as findings from phase 2) to establish the validity of the insights.

The second phase focuses on the Gladstone region, which was considered a useful embedded case as it is heavily dependent on the coal and gas industries, and is home to numerous energy intensive resource industries (e.g. aluminium) as well as Queensland's largest coal-fired power station. The region contains a major port with coal (72 Mt in 2015/16) and Liquefied Natural Gas (LNG, 12 Mt exported in 2015/16) the two primary exports [59]. Over $200 billion has been invested in the LNG industry in Gladstone (as the heart of all LNG production on the east coast) in the understanding that it will be a key growth area [60]. As such it has a high potential to be negatively impacted by these state, national and global level transitions. However the presence of large amounts of energy infrastructure, engineering and construction expertise means that it also has a high potential to benefit from it as a renewable energy hub.

The realisation of this potential is in part highly dependent on the willingness of key stakeholders to engage with the transition process. With this in mind for the second phase of research further secondary data materials were collected and collated (i.e. union documents, local government planning documents, existing research and local newspaper reports). Union documents (e.g. submissions and press releases) were analysed and coded according to the different categories of just transition position established by Goods [31], see Table 3 to update that research with recent documentation. The media analysis of the *Gladstone Observer* was undertaken as a proxy for community attitudes to a potential transition and to establish dominant public narratives (i.e. sentiment and outlook) in the region. The local paper has relatively high readership of approximately 43% of the population [61] and among its readership, the majority (73%) trust the *Gladstone Observer* as their primary news source [62]. This approach was considered sound with previous research establish a causal relationship between media coverage and public sentiment [63]. Search terms relating to

"renewable energy" and "energy transition" between 01/01/15 and 30/09/16 were applied with 48 articles returned for analysis. These were coded according to their framing of renewable energy, as opportunity, threat or balanced/neutral. This research was necessary due to the lack of research on community sentiment towards renewable energy and a potential transition in Gladstone, but was cross-referenced with existing research on community attitudes towards environmental matters and sustainability generally, conducted in 2012, for validation.

There are some limitations to the research approach. Firstly this paper does not attempt to establish the full range of green job opportunities what would be available in this region, nor what retraining is possible or appropriate in the area, with this element having to draw on inferences from previous studies. Similarly it does not attempt to address broader issues of the intra-state national electricity market (NEM) and how these would need to be resolved to a reliable and affordable energy supply, with the focus being predominantly on political rather than technical and commercial barriers. Finally the reliance on public position papers and policy documents does not reflect the fact that different members of groups like unions will hold a variety of opinions with regards to transitions. However the use of secondary documents was considered justified as these are likely to reflect the dominant attitudes in their respective organisations, even if these are not universally held.

4. Queensland renewable energy target and expert panel

Queensland has "amongst the highest levels of solar potential in the world" [64] and the current highest penetration of rooftop solar PV systems in Australia [39]. Yet the state-owned electricity grid generation has only 4.4% of demand met by renewable energy production (as of 2015), with the vast majority of the state's electricity generated by black coal-fired power stations [65]. This indicates a lock-into a regime of fossil fuel generation, which is conducive to incremental change at best [4].

However, evidence suggests Queensland is poised at the "take-off" phase of a transition to renewable energy. The target of 50% renewables by 2030 sends a strong signal that the government is committed to supporting renewable projects, though it remains unclear whether this target will be legislated, how it will be supported by policy, and whether it will include household solar PV systems. Establishing the target resulted in a large number of proposed projects from commercial scale energy production, particularly solar PV, in 2016 (see Fig. 2). The fact that solar is also over-taking wind as the cheapest form of generation further bolsters the potential for a take-off [66].

The Queensland Government established a Queensland Renewable Energy Expert Panel (QREEP) to identify "a credible pathway for up to 50% renewable energy generation by 2030", and engaged in a broad process of consultation on the issues and opportunities such a target afforded [18]. This approach seems consistent with transitions management. Similarly an explicit commitment to consider suitable policies to ensure that affected communities are "*equipped to effectively adjust.*" [18] aligns with the just transition perspective. Indeed, there have been public consultation meetings in several regional areas including Gladstone [18]. Although small, the QREEP represents a wide variety of different sectors including NGOs, academic institutions, state government and private sector, and has produced an issues paper inviting individuals and organisations throughout Queensland to contribute ideas regarding the exact form of the eventual target, and the pathways to reach it [18]. The membership resembles a nascent front-runner network [67], which has effectively created a transitions arena whereby stakeholders can feed into the sustainability vision and pathways (see Fig. 1). The QREEP [18] issues paper also notes that business as usual will not be sufficient to achieve the target and "additional policy intervention is likely to be required", suggesting a process of active management moving forwards which is again consistent with the just transitions management framework.

These documents reviewed also reveal some potential however. Fig. 2 also shows 2045 MW of open cycle gas turbine (OCGT) proposals. OCGT is often used to provide "peaking gas" supply to balance out supply intermittency, for it is quick to start-up to cover shortages in supply, but expensive [18]. It can be a great complement to renewable energy to address intermittency, however research in Australia and Germany reveals that reliance on peaking gas creates considerable price instability, with Queensland already experiencing very high price spikes in spite of a very low level of renewable energy generation [18,68,69], risking distributional justice. McConnell et al. [37] also suggest it may be unnecessary as forms of energy storage (i.e. pumped hydro and batteries) to play this role at lower cost and lower emissions.

A secondary issue it investing in OCGT would reduce the market share for both renewable energy and storage, with the market already saturated and demand projected to remain static due to domestic solar PV [70]. Investment in OCGT could create a lock-in trajectory (see Table 1) by limiting investment in storage technology, with OCGT plants running for decades while decreasing affordability, jeopardising distributional justice. This would also be incompatible with an eventual transition to 100% renewable energy before 2050 (deemed necessary for Australia to meet its Paris commitments in the long-term; CCA [42]).

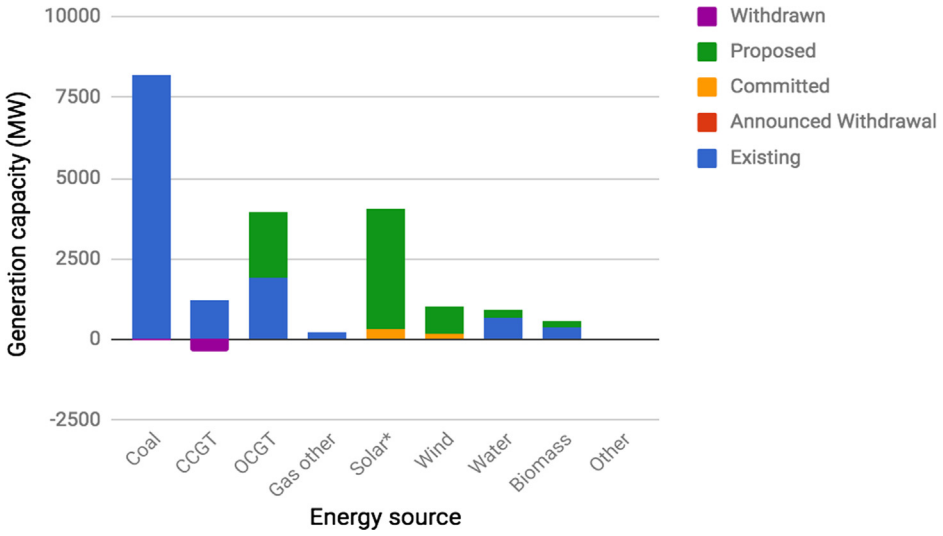

Fig. 2. Electricity generation by source in Queensland. Data source: AEMO [98], *: Does not include rooftop installation.

Table 4
Numbers of submissions to issue paper consultation by actor type.

Actor type	Specific actor type	Supportive	Sceptical	Neutral/mixed	Total no. of submitters	Example
Neutral	Business			1	1	Gamma Energy Technology
	Peak industry body	1		1	2	Engineers Australia Queensland
	Private citizen	2	4	2	8	–
	Regional government			1	1	Isaac Regional Council
	State government			1	1	QLD state development body
	Union	1			1	Electrical Trades Union
	University	4			4	University of Queensland
	Utility	1			1	Queensland Urban Utilities
	Total	**9**	**4**	**6**	**19**	
Niche	Business	9			9	Equis Australia
	CSO	8			8	Australian Conservation Foundation
	Peak industry body	1			1	Energy Certificate Creators Association
	Total	**18**	**0**	**0**	**18**	
Regime	Energy and resource regime peak body		1		1	Australian Energy Council (AEC)
	Energy regime	2	5	2	9	Origin Energy
	Energy regime peak body		1		1	Energy Networks Association
	Resource regime	1	3		4	Rio Tinto
	Resource regime peak body		3		3	Australian Minerals Council
	Total	**3**	**13**	**2**	**18**	
	Grand total	**30**	**17**	**8**	**56**	

The analysis of the initial issues paper released by the expert panel reveals further potential barriers. There is no clear role for the Renewable Energy Expert Panel beyond the advisory report or what resources are likely to be made available to support the transition into the future. Furthermore, there are no clear indicators or suggestions regarding how future networks may form; connected actor-networks are critical to the governance of the change processes [67], and to avoid capture by the incumbent energy regime [13].

Analysis of the submissions to the Queensland Renewable Energy Expert Panel: Issues Paper reveals further potential barriers. Across all 56 submissions received, there was relatively even representation between actors that may be characterised as aligned with the niche, regime or unaligned with a variety of scales of operation from the global to the local on both the regime and niche sides (see Table 4). There was a consensus on certain recommendations, with a balanced number across regime and niche stakeholder submissions (see Table 5). These recommendations reflected a call for bipartisanship, policy stability and a desire to streamline approvals and connection processes. This may reflect that these suggestions benefit traditional and renewable energy sectors, with instability negatively impacting investment in both areas, with approvals and connection processes as adding a further element of uncertainty.

This point is embedded further by a number of energy regime stakeholders, such as AGL Energy (an energy gentailer), Ergon Energy (state-owned distributor) and the AEMO (NEM operator). These stakeholders generally supportive or express mixed views with regards the target of 50% by 2030. Critically they stressed the need to give due consideration to the design of the broader NEM and how the current network will need to be further developed to support alternative energy provision models [71,72]. This indicates the necessity of more supportive policy at the federal level (see Section 3.1), ideally with bipartisan support to ensure alignment with state-level policies. As highlighted in Section 3.1, the risk of not achieving this has negative implications for energy affordability and security both currently and in the long-term, threatening distributional justice.

However the nature of the target itself was highly contested. Resource regime actors, such as the Queensland Resources Council, as well as some energy regime actors, strongly assert that a technology

Table 5
Summary of most frequent recommendations from submissions to renewable energy expert paper, divided by actor type.

Recommendation	Regime	Niche	Neutral	Total
Recommendations relating to the nature and ambition of target				
Implement a technology neutral carbon pricing/emissions intensity scheme rather than renewable energy target	10		2	12
Align state policy with national level carbon reduction target	10		1	11
Consider including transport energy in the target	1	2	1	4
Recommendations on supporting mechanisms				
Streamline approval processes	5	5	1	11
Implement reverse auctions	1	6		7
Do not introduce market distorting incentives for renewable energy	7			7
Support medium/small scale renewable energy schemes in remote/grid fringe areas	1	4	1	6
Simplify connection process	2	4		6
Consider/support community generation schemes		2	2	4
Recommendations on policy				
Agree long-term bipartisan policies/ensure policy stability	5	6	1	12
Complement with strong energy efficiency policies and programs		6	1	7
Integrate energy policy with broader climate policy/carbon reduction targets	3	2	1	6
Recommendations relating to distributional impacts				
Consider the likely price increases caused by renewable energy	5			5
Take a portfolio approach to mitigate intermittency	2	2	1	5
Provide training to re-skill workers in affected sectors	1	1	2	4

neutral carbon emissions target should be adopted to support the potential use of existing fossil fuel infrastructure, notably thermal coal with CCS and natural gas (e.g. [73–74]). This is consistent with previous regime strategies to divert government subsidies to "evasive innovation" (see Section 3.1), leading to a lock-in trajectory (see Table 1). On the other hand, niche civil society organisations (CSOs) and businesses support the target and call for technology specific incentives and reverse auctions for renewable energy. A small number of stakeholders suggest extending or explicitly framing the target in the context of an eventual transition to 100% renewable energy [75–77].

The niche recommendations for a longer term and more ambitious target highlight the fact that the 50% target is arguably too short-term as a sustainability vision for transition management purposes. Sustainability visions are typically set for generations (often between 25 and 50 years) into the future to ensure that the pathways taken are appropriate and don't lead to lock-in prematurely [7,67]. A 50% target opens the path to considerable investment in OCGT and other low (but not zero) carbon technologies by not placing a deadline on their phase-out. A target of 100% Renewable Energy by 2050 is consistent with Australia's Paris commitment [42], and would discourage OCGT investment by limiting the period of return for OCGT plants to 32 years; thus, creating a stable policy environment for energy investment decision making clear selective pressure against fossil fuel generation which is a key role of such a vision [78]. By contrast the resource regime proposal of an emissions reduction target would allow the use of clean coal, CCS or CCGT base-load gas plants, all of which either have substantially more emissions than renewable sources or a much higher levelised cost of electricity (see [79], p. IV). This demonstrates the need for a clear long-term vision that creates selective pressures is needed to resist evasive innovation and a lock-in trajectory.

The absence of such a vision and a clear role for actor networks leaves the transition at risk of regime capture, as seen in other countries (e.g. the Netherlands; [13]). This is not unfeasible in Australia where resource sector actors have a disproportionate influence over state governments (see Section 3.1). In their submission the peak body for the Queensland resources industry repeatedly states the considerable value of the royalties (enough to employ "30,000 nurses") and tax they generate, they assert "Low cost and reliable energy supply has been a foundation of the Queensland model of economic development", implying economic disaster, rising prices and voter backlash [74].

However the submissions indicated a clear alignment between the recommendations of supportive actors across business, academia and civil-society, indicating a strong potential to form niche actor-networks that could counterbalance the influence of the regime while facilitating the transition at the tactical and operational level [21]. A number show an interest in smart/microgrids, community schemes and experiments in fringe of grid areas. This suggests a strong potential to form networks to support the experimentation and cyclical learning approach prescribed by transitions management [13]. Adopting a transition management approach would provide a platform for these actors that would be otherwise marginalised from transition processes by the relative power of regime actors from energy-decision making.

Engaging unions and communities in traditional energy production regions in network governance through a just transitions approach could strengthen such networks further, securing recognition and procedural justice while mobilising public support to help achieve bipartisanship. The next section considers the likelihood of such engagement in the Gladstone region, as well as potential to accumulate the benefits of the transition in the region to mitigate the costs.

5. Local opportunities and constraints for a just transition in Gladstone

As outlined in Section 3.2 Gladstone is heavily reliant on energy intensive manufacturing industries such as LNG and aluminium, fossil fuel exports to Asia in the form of coal, and LNG for employment and revenue. These industries remain strong advocates for the continued use of fossil fuels (see Section 3.1). As noted in Section 3.1, a number of these industries are likely to be negatively impacted by the global transition to renewable energy. Exports of LNG to Asia from Gladstone were operating at close to the cost of production in 2016 with established trains at risk of being forced to operate below capacity or shut down [60], and one proposed LNG train project was cancelled [80]. Similarly, a 25.5% contraction in mining investment was predicted for 2016–17, and federal recognition of an economy transitioning away from mining [81].

The aluminium industry is also under pressure. For example, a local smelter, which is thought to employ a 1000 directly and another 3000 indirectly in the region [82], is struggling to generate a profit even after a full exemption from the national Renewable Energy Target (RET) scheme due to rising energy prices [83]. Unemployment in the region has steadily risen, from 4% in September 2014 to 7.9% in June 2017 [84]. The state's energy transition could compound this without careful management. Failure to secure affordable and reliable electricity supply would see impacts flow beyond directly affected sectors to those in energy intensive trade exposed industries (EITEIs). In terms of energy generation workers, it is likely that coal-fired stations will be forced out of the market by the low wholesale price of renewable energy, due to the merit-order nature of the National Energy Market [18]. The potential for distributional injustice is high with the costs of the process concentrated in the region rather than distributed equally, with potentially few benefits.

However there is potential for to mitigate the costs by concentrating benefits of transition in the region. Gladstone has a strong solar resource and is one of only three locations in Queensland that has greater than 400 MW of installed connection point capacity [64] making it well-suited to a transition as the literature suggests proximity of infrastructure to resources is a key factor (see, e.g. [85]). Furthermore, the existing gas infrastructure means Gladstone may be well placed to become a clean energy exporter into the future. Indeed, Professor Garnaut released a statement suggesting that a "voracious demand" for clean energy in Asia could be satisfied by solar thermal generated hydrogen fuel cells using existing LNG infrastructure [86]. Gladstone has both the solar resources and infrastructure to support such an industry.

There is evident potential and need for economic diversification, but a review of current regional plans for central Queensland and Gladstone make little to no reference of renewable energy, the need to diversify the economy or of the upcoming economic transition predicted by the state treasury [87–89]. Instead, the focus remains on the continuing potential of coal, gas and energy as key sectors in their current form.

This reflects the strong regime influence in the area. The aluminium and LNG industries successfully lobbied for a full exemption from the national RET in 2015 [90] with strong support from Federal MP for Flynn (federal division for Gladstone), Ken O'Dowd and the Australian Worker's Union (a national union with a major presence in Gladstone) [91]. This exemption interferes with distributional justice by shifting the costs of the RET to households [92] and indicates the influence of the regime over democratic institutions in Gladstone. Nevertheless, a just transition may still be achievable if unions and communities within Gladstone are supportive of, and included in, an active transition management process. The following sections examine the likelihood of this.

5.1. Potential union engagement

Historically, unions have been supportive of regime industries in their resistance to niche emergence [93]. This support was secured through a prevalent 'jobs carnage' narrative in Australia. For example, the head of the Mineral Council of Australia responded to the proposed emissions trading scheme in 2009, suggesting it would "shed 23,510 jobs in the minerals sector by 2020 and more than 66,000 by 2030… the impact on regional Australia being severe" [51]. However, Table 6

Table 6
Position of unions representing four major worker segments in Gladstone.

Union	Position	Example statements	Source
CFMEU – Construction, mining and energy	Passive progressing to minimalist	Therefore there must be explicit commitments to programs that will ensure that those likely to be adversely affected are looked after. The CFMEU recommends that the Climate Change Authority make a far more integrated and deeper commitment to developing targets and the pathways to achieve them that is just and fair for all Australians. If that doesn't extend to large-scale programs for the regions that we know will be hard hit, the policy program will not have met the equity threshold.	CFMEU [102], p.10 p.15
AMWU – Manufacturing	Consistently minimalist	Climate and renewable energy (policy) – Calls for a reinvigorated push towards a renewable energy economy that supports, transitions and retrains affected workers	AMWU [103]
ETU – Electrical (Primary union representing workers in the Gladstone power station)	Consistently minimalist	We support the increased take up of renewable energy and the responsibility the Panel is tasked with will play a critical role in defining Queensland's renewable future in the immediate and medium term. An essential element to in mapping out a viable pathway to increasing renewables is ensuring that there is a just transition plan for affected workers and vulnerable communities as the inevitable structural adjustment takes place… Renewable energy and energy efficiency are more labour intensive than fossil fuels and should therefore create more jobs…If the policy settings are right, the faster the transition to clean energy, the greater the jobs increase.	ETU, [104] P.2 P.7
AWU – Cross-sector	Consistently passive	Australian Workers' Union National Secretary Scott McDine has urged Prime Minister Tony Abbott to listen to the views of his backbench and exempt aluminium smelting from the Renewable Energy Target (RET). "Industry is begging for certainty on the RET so it can invest with confidence in Australian jobs," Mr. McDine said.	AWU [105]

reflects a broader acceptance of transitions and the minimalist position (see Table 3), though this is not universal. The Australia's Workers Union continue to adopt a passive stance in relation to renewable energy helping key resource actors fight successfully for an exemption from the RET scheme. That example demonstrates how union resistance to a transition has the potential to shift the public narrative from one of a regime trying to defend its own interests at the costs of the public good, to one of a community whose livelihoods are being jeopardised by fringe interests.

Conversely, the shift of the CFMEU, who were strong advocates for a passive position [31], is encouraging as it suggests that the trend of movement away from the passive position has continued since Goods' research was conducted. The CFMEU supported Federal Labor's 50% renewable energy target "on the condition a Labour government provide unprecedented assistance for thousands of workers in traditional coal-fired generators and mines who might lose their jobs." [94]. Similarly, the ETU submission to the issues paper reflects general optimism about the transition as long as policy is carefully formed to support affected workers. This suggests that committing to and funding the notion of a just transition could be an effective way to engage the support of at least some of the key unions in Gladstone. The next section considers the barriers and opportunities to engage the broader community and civil society in Gladstone to engage with and support a transition process, and its potential to empower the community.

5.2. Potential community engagement

There has been limited academic engagement of communities within Gladstone regarding their views on renewable energy and transition pathways. However, a study by Eriksen [95] revealed that Gladstone residents and ex-residents were reluctant to engage with any environmental issues that were critical of incumbent industry as not only "…*[p]owerful actors such as the Regional Council, the GPC, the local newspaper (Gladstone Observer) and resource companies like Rio Tinto discourage negative criticism, but local residents as well, many of whom in their day moved to Gladstone for economic reasons…*" [95]. Eriksen [95] found that individuals in the community had lost their jobs and others who had been forced to move away after being subjected to intimidation for speaking up against industry. The study also reveals a perception of environmental NGOs as aloof and simply wanting to shut Gladstone down, demonstrating the same "indifference and arrogance they experienced from large corporations or from the state government in Brisbane" [95]. Nevertheless, the interview data revealed how residents wanted to be sustainable, but that it was secondary to livelihood concerns. Eriksen reflects upon this as a "double bind" of economic growth and environmental degradation being played out at a personal level, with the community feeling disempowered and in the thrall of industry in the area and marginalised from state government processes [95].

Media analysis of the Gladstone Observer (see Table 7), suggests this sentiment extends to renewable energy, for it reveals a strong framing of renewable energy as a direct threat, especially in 2015. A number of articles from 2015 present renewable energy as a "jobs killer" [96]. There was a particular focus on the potential impacts of the RET on the aluminium industry as a "regulatory burden" which was costing aluminium smelters "about $25million per year" [97], and was the focus of 14 of the 34 articles featuring renewable energy that year. These primarily quoted senior industry figures and Ken O'Dowd, Gladstone's Federal MP, which is indicative of the power of the regime in creating an environment vs. jobs narrative in the region with the support of key political figures and local media. Eriksen's [95] research suggests that this narrative would be very effective at securing support within the community, making engagement with a transition less likely.

Of note, the media analysis also reveals a noticeable shift in the framing of renewable energy in 2016. Though a strong environment vs. jobs theme was clear in certain articles, a greater proportion frame renewable energy as an opportunity rather than a threat, with one article explicitly framing renewable energy as a critical future industry for regional Queensland (see Table 7) and another four highlighting the jobs potential of offshore wind and a new biofuel hub in the region. This indicates a shift of the framing of renewable energy as inimical to regional jobs to a new framing as a source of prosperity. An explicit commitment to a just transitions approach would support this narrative in communities and resolve the personal "double-bind" described by Eriksen [95]. Similarly the formation of inclusive regional transition processes with inclusive committees would help empower and engage communities who currently feel beholden to the "arrogance and indifference" of companies and marginalised by state government processes [95].

Table 7
Results of media analysis of Gladstone Observer articles (2015 and 2016).

Framing	2015	2016	Example headline	Example statement
Opportunity	3	8	Passionate plea to prevent 'ghost town'	"Central Queensland needs help now and residents are suffering because of a lack of transition programs for the region. With all this talk of jobs and growth, what are your plans for central Queensland to ensure it is not littered with ghost towns?…I think it's rather naive to continue to hold on to coal. I think it's important we think outside the box so we can prepare the workers for that transition when it does happen,"
Threat	11	2	RET pledge job killer: O'Dowd	…Ken O'Dowd has condemned Opposition Leader Bill Shorten's pledge to increase the renewable energy target to 50% by 2030 and reintroduce an emissions trading scheme (ETS) as a "job killer" for his region. "The only thing this region is likely to gain from a Labour government is high unemployment caused by this job-killing carbon tax they want to resurrect," Mr. O'Dowd said. Mr. O'Dowd has pointed to emissions-intensive trade-exposed industries (EITEI) in his electorate, including Boyne Smelters Limited (BSL) that will feel the heat of Labor's planned target.
Balanced or neutral	20	4	Trash goes up in gas	Benaraby landfill is an untapped power resource that would help the Gladstone regional Council achieve its renewable energy targets. The landfill produces more than 190 tonnes of methane gas, which is being burnt off using a flare. Councillor Col Chapman wants the council to look more seriously at turning that gas into electricity.

6. Discussion

In response to research objective 1 (see Section 1), there now appears to be an alignment of factors including: landscape pressure on the regime; popular support; a high level of interest from renewable energy companies; and the policy support (at the state level) required for small and large scale industries to enter the take-off phase of a transition in Queensland. Similarly, it appears possible to transition in a manner that ensures affordability and reliability of supply while mitigating negative impacts in traditional energy production regions with careful planning and management. Nevertheless, there remain several elements missing for a successful and just, sustainable transition to renewable energy in Queensland (see Table 8), which may continue to challenge a transition.

The absence of key elements indicates that the Queensland transition is at risk of either lock-in or backlash, both of which would result in unjust outcomes in the form of: rising energy prices, energy insecurity, rising carbon emissions and sudden job losses in the longer term, not only in the energy and fossil fuel extraction sectors but also in a number of energy intensive industries.

However the case study has also illustrated that there is a strong potential for a just transition management process at the state level to mitigate against these negative trajectories. Developing a long-term sustainability vision would create clear selective pressures against paths leading to lock-in through "evasive innovation". Similarly, the formation of actor networks would help resist the influence and narratives of a powerful resource regime; maintain public support; and provide a platform for niche actors and communities who could be marginalised from democratic institutions by an unusually powerful resource regime. However this is contingent on a supportive federal policy context; national transition planning; national grid and improved national market design. Their absence could lead to stability and price issues resulting in increased uptake of peaking gas coupled with unplanned coal-fired power station closures, creating a public backlash and stalling the transition, while creating distributional injustice. Similarly, the process is unlikely to survive a change of state government given the policy hostility at the federal level, indicating a need for bipartisan support.

In response to research objective 2, it seems that communities in traditional energy production regions like Gladstone have an opportunity to benefit from a successful transition to renewable energy, making a just transition possible in theory. The region has the resources, skills and infrastructure to support renewable energy generation, especially large-scale solar PV. Similarly, there would be enough jobs created by a shift to renewable energy, with re-training feasible to support the employees at the Gladstone power station and from the broader resources sector. A nested regional transition management process would help identify a fuller range of green job opportunities and provide in-depth engagement to ensure minimal impacts, ensuring recognition, procedural and distributional justice.

However the aforementioned state and level barriers exist which jeopardise the likelihood of this being achieved. Even if these were overcome using a transition management approach, the research indicates several barriers at the local level that would erode willingness to engage with such a process. The resource regime has a strong presence

Table 8
Summary of applying the just transition management framework to the Gladstone context.

Element	Status	Explanation
Landscape pressures on regime	Present	Paris agreement and global transition placing pressure on generation and resource regime
Niche aligning with landscape	Present	Renewable energy firms and ENGOs goals supported by RE cost decreasing globally.
Popular support	Present	Strong support and public expectation of coal phase-out, unknown distribution of support.
Formation of transition arena and frontrunner network	Partial	Transition arena formed but uncertain future and resourcing
Government taking a leading role and providing a supportive policy framework	State: Present Federal: Absent	Supportive state government but a lack of centralised planning and reduced shielding and nurturing policy support at the national level.
Clear, shared long term vision with supporting goals, interim objectives and monitoring	Absent	Long term vision is too short, risking capture by the regime and lock-in
Participatory process of active industrial planning	Unclear	Commitment to active planning of transition, but participation currently limited to consultation.
Transition balanced with need for affordability and reliability of on-going supply	Missing	Affordability and reliability jeopardised lack of federal support or nurturing policy and reliance on gas, risk of backlash
Evolution over long time scales as opposed to sudden revolutions	Partial	Short term target may need rapid change
Labour unions communities and CSOs involved in transition planning	Partial	Labour unions, CSOs and the community were invited to engage with the transitions process but limited to consultation, potential reluctance to engage with any threat to current industry, though renewable energy is being framed more positively.
Impacts on vulnerable communities are mitigated by appropriate fiscal support and green job creation	Possible but not guaranteed	Strong employment and retraining potential but dependent on advanced long-term planning and funding which are both unconfirmed

in the area and has resisted the transition at the national level by mobilising government, worker, media and community opposition to renewable energy using an environment vs. jobs narrative. This has reduced the potential willingness of unions and the community to engage with the transition process, a fact that jeopardises the potential for procedural justice. The government has neither formally adopted an explicit management approach nor allocated funds to support it, limiting community and union engagement to consultation levels with no explicit nested process. Hence, there are a number of crucial elements missing that would ensure that the transition would be a just one for regions like Gladstone (see Fig. 1).

However again the research indicates that it is possible to overcome these barriers, particularly as the local media has undergone a shift in how it represents renewable energy – from threat to opportunity. Coupled with an increased support for a just transition from key unions, a growing willingness to engage positively with the unfolding transition is emerging. A commitment to just transitions principles in the context of an active state transition management process (with nested inclusive regional processes) could help build on this to further deepen engagement, and help overcome the key barriers to a just sustainability transition (see Table 9). Strengthening and legitimising niche actor networks with community and union support could help these networks then become a crucial counterpoint to the influence and narratives of the incumbent regime at the state level. Furthermore, these networks could help the state transition process endure a change of state government by mobilising public support to strongly resist any policy rollback, and perhaps even help achieve bipartisan support for strong national level process.

With regards to research objective 3, it appears that the application of a just transition management approach could feasibly support a transition to 100% renewable energy whilst securing energy justice in this context (and potentially globally as argued below. The framework (Fig. 1) has helped identify the shortcomings of the current process and identify recommendations, as outlined in Table 9. The concepts of transitions management and just transitions appear to be mutually reinforcing. A consideration of just transitions has helped to highlight the social barriers and politics of the potential transition. This not only helps achieve procedural and recognition justice, it helps mobilise community and union support to form strong actor networks to accelerate and ensure the success of energy transitions. This explicit recognition of transition politics helps overcome some key barriers to the transition in the form of the resource sector and policy fluctuation resulting from bipartisanship. Similarly just transitions benefits from transitions management. Conversely the transition management approach provides the careful planning necessary to ensure affordability and reliability of supply; that retirements are timed with re-training; that affected communities can achieve both sustainability and prosperity; and that industries providing long-term employment opportunities are nurtured in affected areas.

Further to this the authors would argue that just transition management framework could make a considerable contribution to the energy justice scholarship and securing energy justice globally. The just transition concept alone helps ensure the inclusion of key groups that have been historically marginalised from energy decision making, which is essential to achieving procedural and recognition justice. It also seeks to concentrate the benefits of transitions to regions and groups where the costs are most likely to accrue, helping to achieve distributional justice. Furthermore the fact that the concept has been adopted at global and national level by unions, NGOs and multilateral actors such as the UNEP (see Section 2) means it has strong potential to create links between energy justice scholars and number of key stakeholders in transitions at multiple scales. Meanwhile the transition management element ensures a deliberative process, which it is argued here is necessary to (a) ensure the affordability and reliability of supply in the long-term and (b) ensure that the costs and benefits of transition processes are fully recognised and distributed evenly. This is a key element of distributional justice. It also supports the formation of actor networks to address political asymmetries in transitions. Crucially it builds on knowledge gathered from anecdotal transitions to avoid backlash, optimisation or system breakdown trajectories, all of which would lead to energy injustice. Here it has played a crucial role in recognising the key factors that could lead to these trajectories as well as recommendations for mitigating them.

In concert the concepts form a framework could be a powerful tool for recognising and managing the political (and other) barriers to energy justice in transitions globally while mitigating the risk and injustice of a failed transition. What the framework does not do is establish how much engagement is appropriate or desirable, or the full range of groups that should be included (e.g. the just transition concept could be extended to explicitly include indigenous groups). Similarly, it does not provide an exact plan for who can be trained into which role, this would only become apparent from an application of the principles in context with a process of extensive consultation. This is where a nested regional transition management process could be useful and arguably necessary. What it does do is provide a useful set of principles to support this, informing a process design which anticipates potential

Table 9
Summary of the potential barriers to a just sustainability for traditional energy production regions in Queensland.

Barrier	Description	Recommendations
Lack of bipartisan commitment to a transition	Lack of policy support and planning at the national level, combined with the reduction of funds for niche development and the potential of a change of government at state level risks the affordability and reliability of supply and a potential backlash	State governments with more ambitious renewable energy targets and niche actors networks strengthened with union and community involvement, mobilise public support to petition the federal government to establish long-term carbon policies and renewable energy targets, supported by investment in niche development (especially storage), infrastructure investment and national energy market design
Lack of a clear management approach with a long term sustainability vision	The lack of clarity around the on-going process and sufficiently strong sustainability vision risks capture by the regime, lock-in and alienation of communities	Commit to a transition management approach by establishing the current panel as a permanent front-runner network, supported by niche actor networks involving communities and unions in vulnerable regions Establish a long-term sustainability vision consistent with Paris commitments i.e. 100% renewable energy by 2050 with back-cast interim targets (e.g. 50% renewable energy by 2030)
Unions and communities reluctant to engage with the transitions due to regime narratives	Potential resistance in a region that could play a key operational and tactical role in the transition. Would create unjust outcomes by slowing the transition or increasing adverse impacts with sudden rather than planned power station retirements	State Government and ENGOs engage with local environmental groups, communities and unions with an explicit commitment to a just transition and nested region transition management process to form strong actor networks in support of the transition process Establish fund based on research and consultation for re-training requirements

barriers, mitigates negative impacts, democratises energy decision making and accelerates the transition to a successful conclusion. Here the application of the framework has revealed the considerable role politics can play in energy transitions. The authors hope this will fuel a more explorations of the roles of labor and politics in both the energy justice and transitions management literature, regardless of whether the framework is used to do so.

7. Conclusion

There is an imperative to make a global transition to renewable energy to effectively tackle climate change. Such transitions are challenging with existing practices and dependencies creating a deep inertia in favour of the traditional modes of production, delivering incremental change at best. This paper contends that active management is required to accelerate transitions without endangering security and affordability of energy and ensure energy justice is achieved. The paper attempted to establish how transition management, combined with the just transitions concept, could achieve this while mitigating the negative impacts on workers and communities heavily reliant on traditional energy production and those least able to afford energy. This was done using a qualitative, instrumental nested case study approach focussing on Queensland and the Gladstone region. Secondary data from multiple sources and relevant literature was collected and analysed to establish the current state of the transition and approach in Australia and Queensland; potential barriers to the process achieving procedural, recognition and distributional justice in energy production regions like Gladstone; and the potential of a just transition management approach.

There are encouraging signs that Queensland's transition to renewable energy, is on the verge of take-off. There are key threats, however, in the form of a lack of clarity around process; a lack of a truly long-term vision; and a lack of robust networks between civil society, renewable energy firms, academia, unions and communities to support the process and resist the influence and narratives of a powerful resource regime that favours traditional modes of energy production. Not only does this create concerns of recognition and procedural injustice, it leaves the process open to capture by the regime, leading to a lock-in trajectory. This risk is increased further if the regime is successful in securing the support of communities and unions like those in Gladstone using an "environment vs. jobs" narrative. A failure to resist lock-in is likely to create distributional energy injustices from rising prices as a result of reliance on gas and sudden job losses due to sudden rather than coordinated coal power station retirements.

A second threat is that the Queensland transition seems contingent on stable long-term carbon policy, policy support and integrated planning at the federal level, which is missing currently. Research funding has been cut; carbon abatement policies are weak; a plan to manage the new model of generation electricity market is missing; there is little planning around grid development to guarantee reliability of supply and the current supportive policies are set to expire in 2020 with no clear indicator of what will follow. This represents a threat to the affordability and reliability of supply that has the potential to create a public backlash against renewables and Australia's already weak carbon policy, threatening climate injustice.

Encouragingly this paper suggests that a just transition management approach has the potential to neutralise both threats, creating the long-term vision required to resist lock-in and build strong niche actor networks across scales, with community and union support at the local level. This would help counter regime narratives and influence by securing public support in the long term, which in turn could create greater policy stability by encouraging bipartisan support. It appears that just transition principles could help accelerate transition management processes by building support to resist regime influence and instability, while transitions management can enhance the likelihood of just outcomes through a considered management approach recognising and mitigating potential distributional impacts through the engagement of affected communities in nested processes.

The case study has also shown that the framework could make a considerable contribution to energy justice scholarship globally, and support successful energy transitions that secure energy justice in a much broader range of contexts than Australia alone. It does this by providing a set of general principles that can guide transitions and a set of a criteria that can be used as diagnostic tool to recognise and overcome potential barriers, political or otherwise. The just transition element alone contains explicit commitments to including groups that been marginalised from energy decision-making and to mitigate the costs to vulnerable groups by supporting them to receive the benefits of the transition. Furthermore it is a concept that has been adopted by communities, unions and non-government organisations around the world, providing a valuable potential link between energy justice scholars and a broad range of energy stakeholders in multiple contexts. Meanwhile the transition management element provides a deliberative framework that can be used to recognise and distribute costs and benefits of transition evenly while creating a forum for previously marginalised actors to be actively engaged in the process. It also builds on a wealth of anecdotal transitions to mitigate against an incomplete transition, which, as demonstrated in the case study, has considerable potential to create energy injustice.

This article raises many questions that require further attention. Firstly, in-depth interviews with key participants in regions like Gladstone would help ground these conclusions and assist in distinguishing between conclusions unique to Gladstone, and those that could be useful for informing just transition management process design more broadly. In addition, understanding what level of involvement would be appropriate to accelerate transitions by converting potential barriers into enablers, rather than slowing it down through a level of collaboration that may be an undesired burden to communities and unions, also requires further investigation. Hence, future work is required to understand whether a nested transition management processes is valuable. Similarly, the idea of nesting regional transition processes within broader sectoral processes needs further research into the practicalities and potential benefits of such an approach.

However this paper has provided a start to an intersection between transition management and just transition principles to overcome the barriers to energy transitions and support energy justice. Here it has revealed a number of critical political barriers and just how large a role politics plays in energy transitions, indicating that more research in this area would be critical for advocates of energy justice. The authors believe that though some of the barriers identified are peculiar to the case study, that case study has demonstrated that the framework should be useful to identifying and overcoming barriers to energy transitions in a variety of contexts, helping to achieve energy justice in the process.

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